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IN THIS ISSUE

Focus on Wildlife Conservation

Questions and Answers About Conservation 3
Why are animal species disappearing so fast, and what's the outlook?

The Need to Breed 7
by Robert Bendiner
This excerpt from an important book about zoos describes how they've developed as conservation leaders.

The Survival Network: Zoos Cooperate in Two Programs for Wildlife's Future 10
by Jeffrey P. Cohn

Book News 16
More reading on animal extinction.

Zoo News 17
A season of births.

FONZ News 20
Call for board nominations; your chance to participate in FONZ leadership.

What's New at the Zoo? ... 23

Front Cover
"Tucker" is another success in the National Zoo's program to build a captive population of orangutans, which are highly endangered in their native Borneo and Sumatra. (Photo by Jessie Cohen, NZP Office of Graphics and Exhibits.)

Questions and Answers About Conservation

FONZ photo

Red pandas, the less known but no less charming relatives of the giant panda, are a National Zoo success story. The Zoo is part of an international effort to build a captive population so these animals may be viewed by the public without further depleting the wild population. Red pandas born here have been sent to 19 other zoos.

When you've walked through the Zoo, you've probably noticed that some of the signs tell you about the animal's status in the wild: some are endangered, and the Père David's deer is extinct outside captive groups. Why are animal species disappearing from the world? What does it mean to us?

The problem of animal extinction can't be completely explored in a single issue of any magazine, but in this Zoogoer, *we put together information, viewpoints and suggestions for further reading. The photographs highlight endangered animals the National Zoo has had particular success in breeding.*

Why is the problem of animal extinction so critical now? Species have always become extinct.

In natural extinction, changing environments (climate and sea level changes, for example) cause some species to become extinct, but there is time for others to develop to take their places. The extinction of the dinosaurs made possible the rise of the mammals.

But the explosive growth of the human population and our exploitation of the land has increased the

rate of animal extinctions alarmingly, with no opportunity for new species to evolve.

During the great dinosaur "die-off" 70 million years ago, one species was lost every 1000 years. By some estimates, one species of mammal or bird disappeared *every four years* between 1600 and 1900. From 1900 to the present, the rate increased from one per year to as many as *one per day*. By the end of the century, the figure could be *one per hour*.

How have we had such an enormous impact on animal populations?

Hunting for food is no more than a minor factor in the destruction of wildlife. Sport hunting has had a somewhat more serious effect, although hunters say they've actually helped wildlife because they promote habitat preservation and because they benefit the herds by "thinning out the ranks."

However, as Robert Bendiner, author of *Fall of the Wild, Rise of the Zoo*, points out, ". . .the thrill of the sport is to take not the weakest, the smallest, the most sickly of the herd, as a carnivore might, but the biggest, the most glamorous specimen. . . ."

Sport hunting reached what Bendiner calls "scandalous proportions" in 19th century America and in colonial Africa, Southeast Asia and India (where one 1943 hunting party killed 2310 birds in a single day). Although hunting is generally regulated, poaching is still a problem in many areas, especially where money is to be made on animals and animal products.

The commercial trade in animal products (legal and illegal) is an extremely serious problem. Products include reptile skins, cat pelts and bird feathers plus a host of items believed to be aphrodisiacs, like tiger steaks. Illegal products are often marked as legal ones to get them past customs officials.

While the laws protecting animals are generally sound, according to the World Wildlife Fund, the enforcement is often very poor primarily because of lack of funds. (CITES, the Convention on International Trade in Endangered Species of Wild Fauna and Flora, is the international treaty regulating trade in plants and animals.) For example, many African countries have banned the export of ivory. But it is not difficult for that illegal ivory to find its way to Hong Kong where legal documents can be acquired for its export to the United States and other countries.

Live animal trade has become much more strictly regulated as governments have developed more regard for their animal populations. However, for each live animal imported legally, many others may have lost their lives during capture and transport.

Public attention has helped bring about greater protection for such "popular" animals as the elephant, but many other species, not as glamorous but with crucial roles in our environment, need more attention.

Japan is the largest consumer of wildlife and wild animal products. The United States is second overall and first in some categories. (More information on animal product trade is available from TRAFFIC, a division of World Wildlife Fund—U.S., 1601 Connecticut Avenue, N.W., Washington, DC 20009.)

But the worst problem of all is habitat destruction (which means plant as well as animal extinctions), and it is the most tragic in that people living in developed countries who genuinely care about wildlife preservation are causing a major part of the problem.

As conservationist and author Norman Myers has pointed out, "Rich-world communities of the temperate zones, containing one-fifth of earth's population, account for four-fifths of raw materials traded through international markets. Many of these materials derive from the tropical zone, which harbours around three-quarters of all species on earth. . . . The connoisseur who seeks out a specialty-import store in New York or Paris or Tokyo, with a view to purchasing some much-sought-after rosewood from Brazil, may be contributing to the destruction of the last forest habitat of an Amazon monkey."

According to a report in *Audubon*, magazine of the National Audubon

Society, "Wildlife habitat is being chain-sawed, paved, and cultivated worldwide at an extraordinary rate, the planet's rain forests alone at an estimated rate of 72,000 acres per *day.*"

There are many political, economic and legal complications and many conflicting claims to the use of the world's land.

The problem of animal extinction has received so much publicity, and lands have been set aside as reserves. Why hasn't more progress been made?

Only one percent of the world's land has been set aside for wildlife protection, and this land is fragmented into small reserves spread over the globe. Some of this land is set aside not because it is critical habitat but because no one else wants it.

Studies show that "islands" of protected land often are not large enough to support the animals they're designed for. Also, different animals have different needs, and the larger animals are especially hard to accommodate.

Tigers, for example, need herds of grazing animals for prey, and the herds in turn need sufficient grasslands (which are themselves interdependent with populations of smaller mammals, birds and insects). Individual tigers need large territories, and there has to be room for enough tigers to ensure genetic variety for a healthy population.

Jessie Cohen, NZP Office of Graphics and Exhibits

Only 40 to 45 Mississippi sandhill cranes still survive in the wild in Mississippi (they do not migrate), including 13 released from Maryland's Patuxent Wildlife Research Center where they were born. Four of the released birds have paired with wild mates. The National Zoo has one pair of the Patuxent birds, and births are expected. The Patuxent and Zoo birds are the only captive population of this species.

Also, larger animals have fewer young at a time and have them less often than, say, the rodents and are thus less adaptable to changing environmental conditions.

Another problem is attitude. A middle-class American may regard a rhinoceros as a heritage of nature; a rural African who wishes to use the land to support his family thinks of the same beast as an enormous pest. And the need for land and resources is growing. The human population of Kenya alone is growing by 4% a year, faster than that of any other country.

One controversial suggestion to resolve this problem is to allow cropping, a systematic harvesting of some herds of wildlife to provide meat and to keep herd numbers in balance with the limited habitat still available to them. This approach might prevent the governments of developing countries from allowing the destruction of the herds. Even its advocates do not embrace cropping wholeheartedly, but regard it as a last resort to save species in a world of growing demands. (For more on cropping, see "Preservation for Profit," *The New York Times Magazine*, September 12, 1982.)

The zoo is a great place for recreation. How does it fit into the conservation picture?

The modern zoo has taken a vital role in wildlife conservation. First, zoos are making every effort to enhance the public's appreciation of all animal species and to raise awareness of the plight of wildlife.

Annual zoo and aquarium attendance is more than 100 million, more than professional baseball and football together, and adults outnumber children three to one. One survey of San Diego Zoo visitors found that two-thirds of them felt closer to nature during their visits. Clearly, zoos are in an excellent position to educate the public on the importance of all species, from elephants to elephant shrews.

Second, zoos are taking the responsibility for maintaining healthy populations of exotic species, a number of which are endangered. Zoos protect those species that are not necessarily endangered by breeding their own exhibit animals rather than taking them from the wild.

Breeding animals in captivity has been no small accomplishment, either, as animal needs vary from species to species. It's not just a matter of putting a male and female together. In some 30% of bird species, males and females cannot be told apart by outward appearance.

Bald eagles will not mate when other birds share their enclosure but do so readily when they're alone. Tree shrews need two nests because they sleep in one and keep their broods in the other. Researchers have spent long hours uncovering these and other "secrets" of animal reproduction so the proper environments could be provided.

Ideally, species surviving only in zoos will be reintroduced to their native habitats when those places become stabilized and protected. If the assault against habitat continues, though, zoos may be the only places where a number of species have survived and people can have this much-appreciated contact with the animals.

Dr. William Conway, director of the New York Zoological Society, tells the story of a young visitor gazing at one of the elephants. Her mother tried to hurry her along, saying, "Come on, now. You've seen hundreds of elephants on TV."

"But not so big," the youngster replied.

When one tugs at a single thing in nature, he finds it attached to the rest of the world.

—John Muir

The Need to Breed

by Robert Bendiner

Some time ago the President of Burma offered to make London's zoo the gift of a takin, a rare creature resembling a muskox but thought by some taxonomists to be closer to the chamois [a hoofed mammal of mountainous regions in Europe]. To the President's surprise, the gift was politely declined by the secretary of the London Zoological Society, later to become Lord Zuckerman. The secretary suggested, however, that since the animal could still be bred in Burma, in spite of its scarcity, he would be glad to accept a *pair* instead.

Nothing was to come of that counter-proposal, but much has been heard of the principle behind it—that a zoo should not serve as a showcase for rare animal specimens unless it intends to promote an increase in their population. Offered only a single specimen, Lord Zuckerman has said, he would turn down even a coelacanth [a species of

Jessie Cohen, NZP Office of Graphics and Exhibits

In perhaps the most remarkable case of preservation in captivity, the Père David's deer has been extinct in the wild for 2,000 years. The individuals in zoos today are all descended from a herd of 18 collected by the Duke of Bedford from various captive groups. The National Zoo has bred 72 healthy young, many going to other zoos.

fish thought to be extinct until individuals were discovered off the coast of Africa in 1938].

Of the score of zoo directors and general curators I talked with across the United States and Europe, none proposed that, even following that principle, zoos could rescue and propagate all of the earth's endangered species. Some, like Dr. Theodore H. Reed, director of the National Zoo in Washington, suggested that two hundred species might conceivably be saved, but most entertained more modest hopes, ranging down to Dr. Conway's [Dr. William G. Conway, director of the New York Zoological Society] estimate of perhaps a hundred. What breeding programs require, above all, is space, and he points out that all the zoos of the world put together are currently obliged to make do with an area smaller than the borough of Brooklyn.

Nevertheless, there is the same unanimity of opinion that zoos are obliged to do all they conceivably can—some say it has become their primary reason for existence—to save as many species as human effort and the budding state of breeding technology will allow.

Biologically, captive breeding may be like raising livestock, but in the present state of knowledge about the mating habits of wild animals it is not much beyond where livestock-raising must have been in Abraham's time, and thus filled with the color and excitement of surprise.

"...the great zoos of today are as far removed from the menageries of fifty years ago as computer technology is removed from the methods of the Victorian counting house."

After all, it is only in the thirty-five years since World War II that the great majority of zoos have stopped offering themselves simply as places of entertainment.

Even the London Zoological Society, which had an early eye to science, made its name first as an attractive amusement. Indeed the new word *zoo* came into its own only when a music-hall artist of the 1860s tickled London with a song that went, "Walking in the Zoo is the O.K. thing to do."

As for the animals that were the show in most early zoos, they were cooped up in noisome little cages, and although they sometimes survived to a respectable age, it is doubtful whether they enjoyed their lives, if one accepts the reasonable view of animal behaviorists that satisfaction in animals is demonstrated not merely by longevity but also by breeding, appetite, and the absence of pathological behavior.

Anyone over the age of fifty is likely to recall the zoo trips of childhood as a montage of balloons, hot dogs, and rows of somewhat scroungy animals, either sleeping or eternally pacing back and forth in small, smelly, almost bare cages—except for the primates, which often took out their boredom in public masturbation or in aggressive efforts to shower the nearest bystander. Even the ungulates in their outdoor paddocks were lethargic, and only the seals could be counted on to offer a mild but continuing entertainment.

In the spring a few babies would arrive, each good for a feature story in the local papers showing mother lion and cubs, baby hippos destined soon to wallow in a foul indoor tank, or perhaps a fawn being bottle-fed by the smiling wife of a keeper. If the seasonal crop was insignificant, it hardly mattered, since animal dealers were always on hand to fill gaps in the collection with freshly imported specimens.

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The Zoo has had great success in breeding its Rothschild's mynahs. Eleven different blood lines are represented, and unrelated pairs have been sent to zoos all over the country. The Zoo is cooperating with other zoos to study the feasibility of releasing captive birds in their native Bali. (Some 200 wild birds were located in a reserve there last summer.)

All of this was a far cry from the beauty that characterizes the best of today's zoos, and a still further cry from their concentration on propagating rare species. Not all of the vast improvement in zoo-keeping that has marked the past forty years stems from the necessity of collections to renew their own animal populations, but I am convinced that this need to breed is the key to most of what has been happening.

By the mid-1940s many of the zoos from England to Japan had been wrecked or starved out. Frankfurt was down to twenty animals when the great Bernard Grzimek took it over. With the job of restocking, zoo people everywhere became acutely aware of what the wisest of them already knew, that populations in the wild were drastically low, and were due to become less and less available to zoos as newly established states in Africa and Asia either slaughtered their wildlife without restriction or began to clamp down on its export.

For the first time animal counts were undertaken from the air, along with field studies of breeding habits and animal behavior in the wild, many of them under the aegis of the world's great zoological societies. All of which produced a great ferment among zoo personnel everywhere, and a surge in breeding programs that in turn inspired advances in zoo building, animal grouping, veterinary medicine, ethology, and other scientific research. As a result, the great zoos of today are as far removed from the menageries of fifty years ago as computer technology is removed from the methods of the Victorian counting house.

Zoos now generally breed their charges with three specific ends in mind. The first and most obvious is to relieve pressure on the wild, as zoos move from their old role of wildlife consumer to that of producer—a purpose forced upon them in part by national and international regulations that make it increasingly hard to import wild animals. The second is to raise animals with a view to reintroducing them into the wild. . . .

And the last is to serve as an ultimate haven, the scene of a last-resort effort to save and propagate endangered species as a scientific and aesthetic boon to future man. If museums can give viewers a sense of awe with plastic dinosaurs and lifeless mastodons, how far more thrilling for our grandchildren to see, in all their flashing vitality, the last of earth's grizzly bears, snow leopards, lemurs, and bongos.

The Survival Network: Zoos Cooperate in Two Programs for Wildlife's Future

by Jeffrey P. Cohn

I. International Species Inventory System

No zoo is an island. While the National Zoo's resources are among the best in the world, the Zoo is also part of a network of zoos connected by the International Species Inventory System (ISIS), a computer-based data bank for captive animals.

Named for the ancient Egyptian goddess of fertility, ISIS records the name, age, sex, parents, location, birth, death and sale or loan of more than 100,000 mammals and birds, including 53,000 living ones. It is used to identify which zoos have what animals, to establish genetic lines of descent and to project future population growth among captive species.

Created in 1974, ISIS was the brainchild of Ulysses Seal and Dale Makey, both University of Minnesota biochemists. Its $175,000 yearly budget is supported by charges to member institutions and by grants from the American Association of Zoological Parks and Aquariums, the American Association of Zoological Veterinarians, the National Institutes of Health and private foundations. ISIS is housed at the Minnesota Zoo in Apple Valley.

From 130 members four years ago, ISIS has grown to 180 participating zoos, aquariums, private collections and research centers in the United States, Canada, Europe, South America and New Zealand. Members range in size from the San Diego Zoo and Wild Animal Park with 4,100 listed animals to The Endangered Species, a private collection of four tigers and leopards in Chiefland, Florida.

Collections of more than 70 animals pay a minimum of $100 annually or $1.40 per animal listed at the end of the year. With more than 2,300 mammals and birds, the National Zoo pays ISIS about $3,250 a year. In return, ISIS sends a biannual report on microfiche of all current animals in its records. Members also get reports on their own collections and a record of what has happened to each animal in them during the past year. Special reports on individual species are sent on request.

While wincing at calling ISIS a computer dating service for zoo animals, Project Director Nathan Flesness admits that it was originally used by zoos to find unrelated mates for their animals. "Finding out what zoos have a particular species tells us who knows how to care for and breed that animal," says Edwin Gould, the National Zoo's curator of mammals. ISIS reports also help zoos look for homes for their surplus animals.

But it is in record keeping that ISIS has made its real mark. "For many zoos, it's cheaper to have us keep records on their collections than it is for them to maintain their own," Flesness says. It also gives

Jessie Cohen, NZP Office of Graphics and Exhibits

Above: ISIS data helped the Zoo decide to emphasize breeding among its lion-tailed macaques. The Zoo has one of the largest collections of this species.

Jessie Cohen, NZP Office of Graphics and Exhibits

Right: The Zoo's Bactrian camels are a domestic strain of the wild breed from central Asia, once widespread but now scarce. The Zoo has 21, a breeding group at its Conservation and Research Center in Front Royal, Virginia, plus animals on exhibit. Sixteen healthy youngsters have been born.

zoos a double check to verify the accuracy of their own records.

Before ISIS, zoo records were often poor or non-existent. Some animals were listed by their Latin names, others by their common names (which could vary from place to place) and still others by names given them by keepers (which could change when the animals were moved). Thus, there might be no way to identify the exact age or the parents of a newly-arrived animal at the National Zoo, says Judith Block, the Zoo's registrar.

"ISIS has helped force all zoos to improve and standardize their records," Block adds. "It has been a great boon for zoos. We are all talking the same language now. An animal that lived 50 years ago should not have died in vain. We should be able to learn from its life. That's what records are all about. They're a tool for managing the animals."

The National Zoo has always kept good records, Block says, dating back to the 19th century. In addition, the Zoo's records are now being computerized to make it possible to exchange data with ISIS via computer tapes rather than by filling out time-consuming cards.

Even with the Zoo's excellent system, ISIS helps. For example, while the Small Mammal House was being renovated, many of the animals were sent to other zoos. But which ones would be sold outright and which loaned so they or their progeny could be reclaimed later? "We checked the ISIS records to find out which animals were plentiful in zoos and could thus be restocked easily and which were not," Block says.

"ISIS has helped force all zoos to improve and standardize their records. . . . We are all talking the same language now."

ISIS can also help zoos decide which animals to breed in captivity. A case in point: The National Zoo had to decide whether to focus its monkey breeding program on the Celebes macaque, the lion-tailed macaque or the gray-cheeked mangabey. After checking ISIS records, Lisa Stevens, who manages the Zoo's primates, chose the lion-tailed macaque. ISIS told her that Celebes macaques were breeding well at many zoos, so no special effort was needed here. Gray-cheeked mangabeys, on the other hand, were not breeding well anywhere, and the Zoo's pair were getting old, so breeding them was unlikely to succeed.

The Zoo's Dr. Gould received a call from a Johns Hopkins University Hospital researcher who wanted to obtain blood samples from slow lorises, relatives of the monkeys, to compare with human samples. The Zoo doesn't have any slow lorises, but by checking ISIS records, Gould was able to tell the scientist who does.

To help zoos in another way, ISIS began collecting physiological data on captive animals on an experimental basis in 1980. Since most zoos have only a few of each species, veterinarians sometimes can't tell if what looks like a sign of illness is really normal behavior. But the ISIS data is based on hundreds of individuals and can give the veterinarian known ranges for temperature, weight, and other factors.

ISIS has come a long way in nine years, but there is still a long road ahead. While most U.S. zoos belong, only 16 outside North America have joined. European zoos have traditionally relied on data from studbooks and the London Zoo's "International Zoo Yearbook."

But Ulysses Seal, ISIS's self-proclaimed "unofficial ambassador," is confident that more foreign zoos will be enlisted. "There is growing interest in Europe in getting better data on captive management that only ISIS can supply," he says.

Also, ISIS records are now limited to mammals and birds. They will soon expand to include reptiles and amphibians, but fish, Flesness admits, may be a bit too much even for a computer system to handle.

Still, if zoos are to fulfill their role in conserving our wild heritage, then ISIS is vital. "We are finding that a common ground is needed between captive and wild management as the wild continues to disappear," Flesness says. "ISIS can help provide that common ground."

FONZ photo

The scimitar-horned oryx, native to Africa, is highly endangered in the wild. The National Zoo has 23 individuals, and 48 healthy youngsters have been born at the Zoo and at the Conservation and Research Center in Front Royal, Virginia. Last year, two pairs were sent to the Bamberger Ranch in Texas, a private participant in the Species Survival Plan for oryx.

II. Species Survival Plan

In 1980, ISIS was given a key role in the Species Survival Plan developed by the American Association of Zoological Parks and Aquariums (AAZPA). The Plan targets endangered species for special cooperative breeding programs among zoos, and ISIS provides critical information about the animals to be involved.

Of course, the best approach to conservation is to protect and preserve wilderness areas and those animals and plants living there. But it is increasingly difficult to protect these lands, and leaving an endangered animal in its natural setting may lead to its rapid disappearance. The last hope for some of these species is in a captive environment.

This effort falls on the zoos and aquariums of the world, and most major zoos today consider it one of their important missions. The long-term goal is the reintroduction of a captive population into a protected wild setting. In the meantime, the key is a carefully managed and stable captive breeding population.

Zoos need sufficient numbers of a species to maintain a balance in the gene pool and avoid the health problems that usually arise when close relatives breed. Up to 500 individual animals may be necessary.

No one zoo can possibly hold that many individuals of one species. But a Species Survival Plan (SSP) can direct the breeding of a single

species represented at several zoos, treating those individual animals as one population. "We have to manage members of endangered species as one biological population rather than as a series of individual collections as before," says Tom Foose, the AAZPA's coordinator at ISIS for the Species Survival Plan.

In choosing species for SSP, the AAZPA tries to help those animals under the most pressure in the wild, to select animals that can be bred in captivity and to represent the diversity of animal species in the world.

A management committee is created for each species. The committee includes representatives from zoos and other facilities that have the species. The committee decides how many individual animals are needed to ensure species survival and proper genetic diversity in captivity, how many can be kept in a limited space, how best to breed the species successfully and which animals to transfer between zoos.

For example, when the gorilla was designated as an SSP animal, all the zoos holding gorillas were approached by AAZPA and asked to participate. Consenting zoos signed an agreement stating they would follow the recommendations of the gorilla management committee.

A studbook was developed on all gorillas in captivity, including their birth dates and places, information about their parents and other data. The studbook information was carefully verified and entered into the ISIS computer system for easier access. This information makes it possible for gorillas to be placed where they'll have the best chance for successful breeding of healthy young.

One recent deal among six zoos illustrates how the Species Survival Plan works. It involved okapis, giraffe-like animals with long necks and black-and-white striped ankles. They are native to the central African rain forest.

In the transfer, the Oklahoma and Dallas zoos exchanged male okapis, and the Brookfield Zoo in Chicago sent a female to the San Diego Zoo. Brookfield also sent a male okapi to the Rotterdam Zoo, which in return sent a female. The Antwerp Zoo sent a male okapi to Brookfield. All these animals are now able to mate with others not related to them.

Cases like this are where ISIS comes in. By analyzing the age and sex data plus the genetic lines of descent of a captive population, Foose and others can recommend scientific management programs to the species survival committees. The goal is to manage animals so the captive populations remain stable and do not exceed the ability of zoos to house and care for them, Foose says.

For example, under the first SSP, designed for Siberian tigers, about 250 animals are needed for the proper genetic diversity. But North American zoos have room for only 1,000 big cats of all species. Clearly, careful planning and cooperation among zoos are crucial to balancing these needs.

Specific plans have been or are being drawn up for about 30 animals, including okapis, Asiatic lions, Siberian tigers, ruffed lemurs, lion-tailed macaques, gaurs (Asiatic wild cattle) and Chinese alligators. The National Zoo chairs the committee for golden lion tamarins and serves on those for rhinos and scimitar-horned oryx. Other species may be added.

The SSP effort alone cannot save the wildlife of the world. It also takes people who are aware that the natural world belongs to no one individual.

But while public attitudes are being reshaped in this direction, SSP can build and maintain the groups of animals that will serve as the seeds of the future.

Jeff Cohn is a free-lance science and technology writer whose articles have appeared in Smithsonian *and other publications as well as previous* Zoogoers.

Zoogoer editor Susan Stauffer contributed to this section.

SSP: A Case in Point

An animal less than two feet long from nose to tail, the golden lion tamarin, is the subject of one of the National Zoo's most comprehensive conservation efforts. The tamarin is nearly extinct in its native Brazil.

Over the last 10 years, the Zoo has bred and studied these animals and now chairs the International Management Committee and the Species Survival Plan for the species. Researchers have learned, for example, that tamarins need the experience of helping raise their younger brothers and sisters to be good parents themselves. The fourth generation born in captivity now lives at the Zoo; some 240 young have been born in 11 years.

The next major step is to return captive-born animals to Brazil and to study the potential for introducing them into the Poço D'Antas Reserve, northeast of Rio de Janeiro, later this year.

Important preparations include a detailed study of the wild population of tamarins to determine how big that population is (at the most, there are fewer than 100 golden lion tamarins left) and whether additional habitat is available. Researchers will also look for any possibility that the wild population might be harmed by the introduction of captive-born animals. Parts of the reserve will be reforested. At the same time, there will be an orientation program for the people living in the area.

Jan Skrentny

Captive-born golden lion tamarins may be released in the species' native Brazil. A successful effort will be a milestone in wildlife conservation.

If no unsolvable problems appear, researchers will stimulate the captive-born tamarins to develop skills such as foraging and food selection that they need in the wild. Then, the plan is to take them to the reserve and release them for short periods during the day, encouraging them with food to come back to protected enclosures at night until they've made the transition to the wild. They'll also be radio-collared so their progress can be studied.

Many factors have to come together correctly for the tamarin project to be successful, but its achievement will be a milestone for wildlife conservation.

BOOK NEWS

The Sinking Ark, *by Norman Myers. Great Britain: Pergamon Press, 1979 (revision printed 1983). 307 pp.; $10.95 (available at FONZ Bookstore-Gallery).*

Extinction: The Causes and Consequences of the Disappearance of Species, *by Paul and Anne Ehrlich. New York: Random House, 1981. 305 pp.; $15.95 (available at FONZ Bookstore-Gallery).*

What is a conservationist? Here is a definition from author Norman Myers:

"There could soon be a shortage of paperpulp. . . . The deficit could be made good through more intensive exploitation of North American forests, and through more extensive exploitation of tropical forests—both of which alternatives might prompt outcries from environmental groups. A third alternative would be for developed-world citizens, who account for five-sixths of all paperpulp consumed world-wide, to make do with inadequate supplies, in which case the cost of newsprint would rise sharply. So perhaps a definition of a conservationist could be a person who applauds when he finds that his daily newspaper has once again gone up in price."

Both these books explore the problem of human-caused animal extinctions with great sensitivity toward the enormity of the loss but also with hard looks at the political, economic and legal factors ultimately leading to the disappearance of species.

The Ehrlichs present a picture of the web of life in which all species have a place. Their perspective is that, "Natural ecosystems support human life through an array of absolutely essential free public services. Once we look closely at the nature of those services and the systems that provide them, and at the roles that individual species and populations play within ecosystems, then it should become clear why any enemy of the Snail Darter is an enemy of yours and ours, too."

From this emphatic point of view, the Ehrlichs then make proposals for new thinking about the environment, including a call for curbs on human population growth and a redistribution of wealth (a concept feared by developed countries but necessary, the authors argue, for survival of other species).

Myers' book, another well-documented and detailed look at the causes of animal extinction, presents an even more comprehensive plan. His view is that we are a global community economically and politically and that we must become global in our thinking environmentally.

One suggestion (far out by Myers' own admission) is that the more developed countries make payments to those less developed to compensate for economic opportunities lost when habitat is preserved rather than used.

Myers looks at some of the viewpoints involved as private interest competes with the public interest for control of resources. For example, quick profits from forest destruction are so much more attractive to many people than preservation of the forest to serve as a watershed, to temper the climate and to attract tourism.

Myers devotes a complete section of the book to the tropical moist forests which may house as many as half of the world's total number of animal species. He describes how the demand for wood products and beef in developed countries has led to the usage of great sections of the world's tropical forest to the detriment of wild animal populations.

Both these books are required reading for anyone who feels a sense of loss for the world's vanishing wildlife. They provide the hard facts, disturbing but necessary to know if a solution is to be found.

They clarify how our daily lives are having an immediate effect on animals of distant continents, persuade us that this is not a lost cause and encourage us to act.

ZOO NEWS

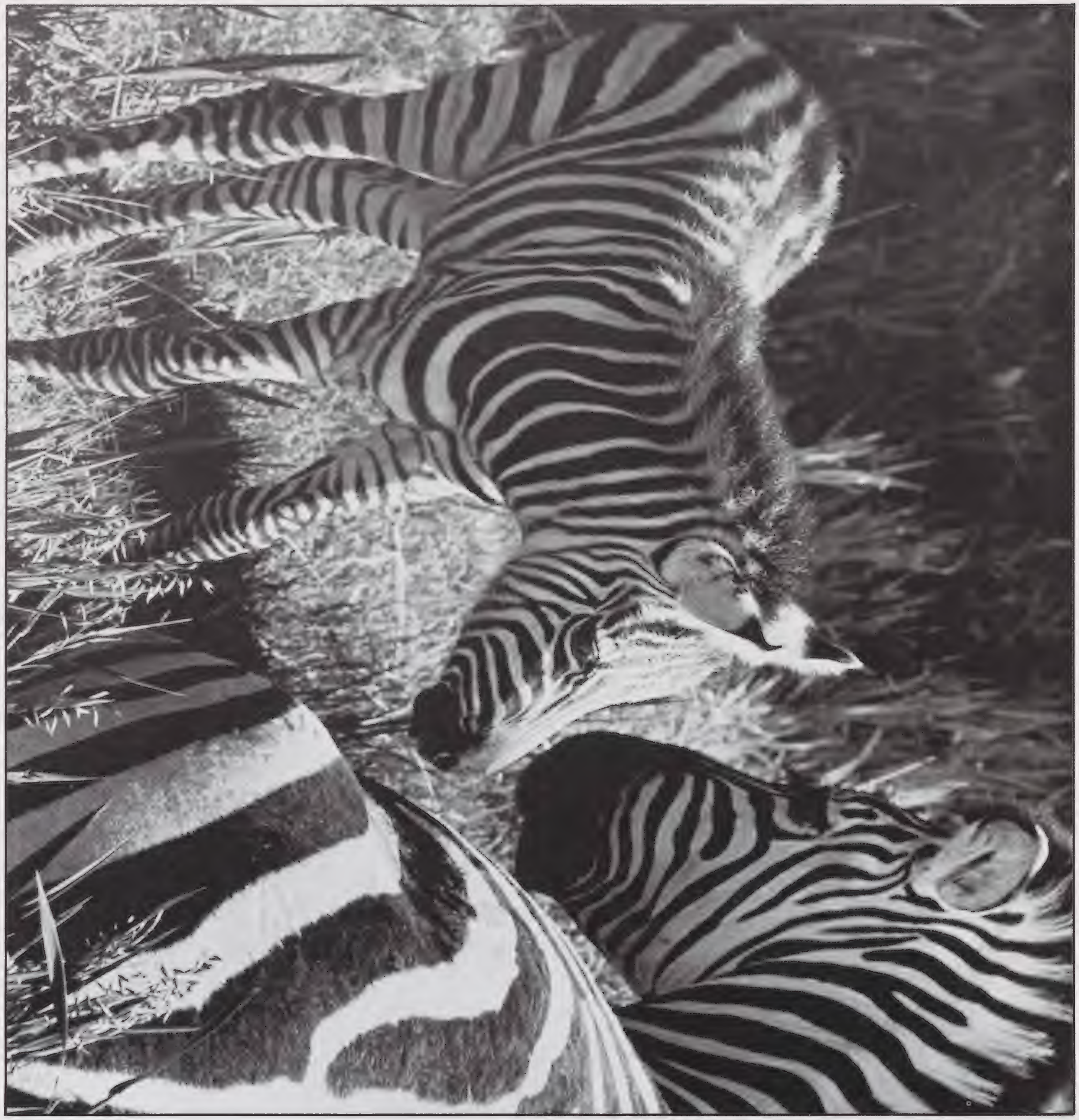
A Season of Births

This spider monkey baby joined the Zoo's population in February.

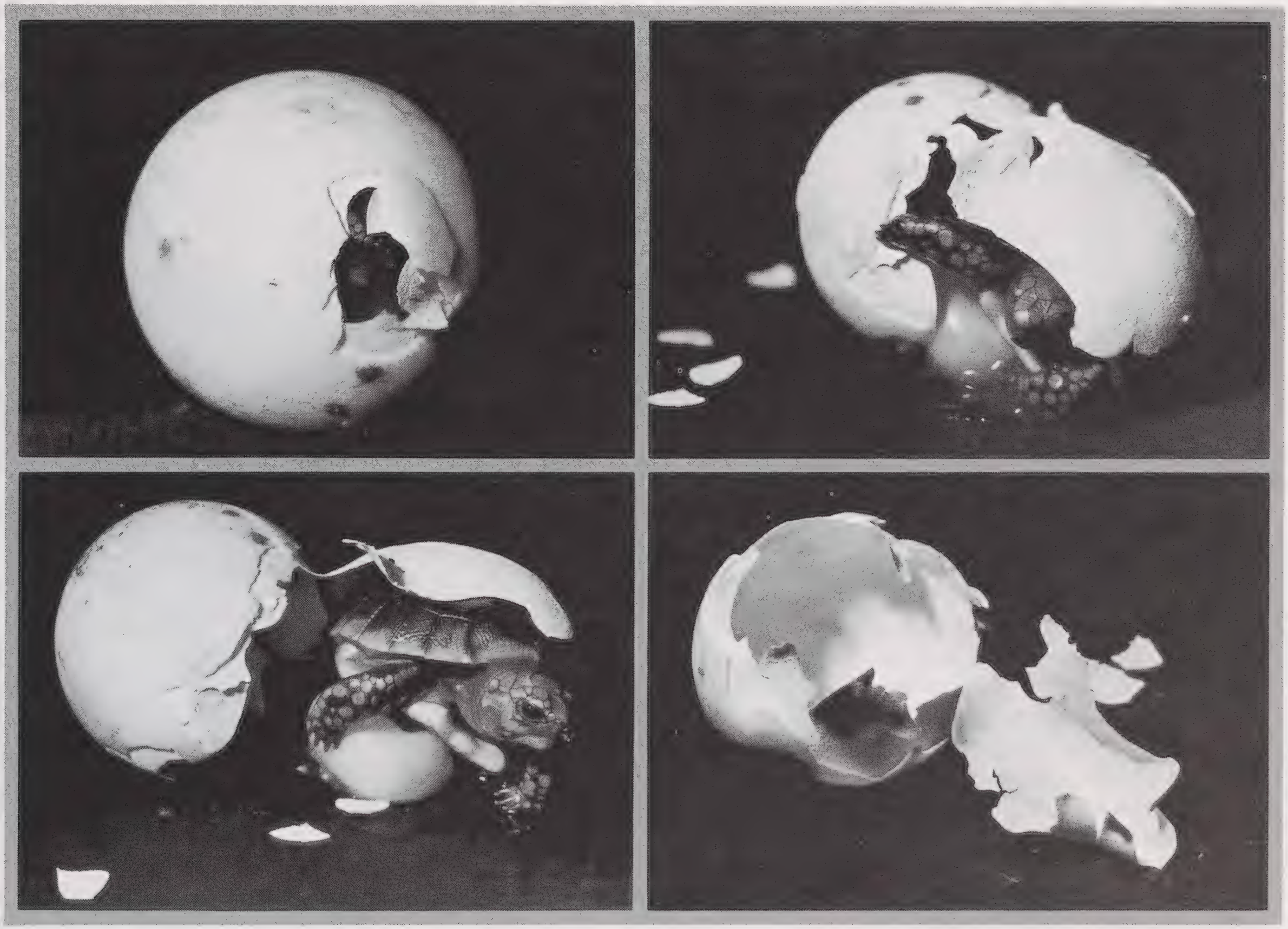
Jessie Cohen, NZP Office of Graphics and Exhibits

Milton H. Tierney, Jr.

The Zoo welcomed this male bongo in March. The first bongo born in captivity in North America came into the world at the National Zoo in 1980.



Jessie Cohen, NZP Office of Graphics and Exhibits



Jessie Cohen, NZP Office of Graphics and Exhibits

The red-footed tortoise cracks its shell with an "egg tooth" which later drops off. Hatching times vary; this hatchling took about a day to crack its shell all the way around and then emerged within a few minutes. The sac underneath is yolk (this one is particularly large) which the young tortoise will absorb.

Opposite: This male zebra was born in early May.

FONZ NEWS

FONZ Travel Opportunities

Pennekamp Reef Sailing/ Snorkeling Adventure August 18-23, 1983

Space is still available on this unique trip to the only underwater national park in the continental United States: John Pennekamp State Park near Key Largo, Florida. This is the perfect opportunity for you and your family to try your hand at sailing and snorkeling in the crystal blue, tropical waters of the Southern Atlantic.

With education being the primary focus, participants will be led on two snorkeling "dives" each day to discover a fascinating undersea world: undulating purple sea fans, boulders of coral adorned with orange feather duster worms and thousands of multi-colored damselfish, snappers, wrasse and angelfish. Participants will also have the chance to learn sailing and navigation techniques.

For more information on this spectacular six-day sea adventure, call Anne Marie Tabacco at 673-4961.

Society Expeditions

The Amazon Cruise is another great travel adventure available to FONZ members.

Amazon Cruise November 1-16, 1983

Explore the Amazon River aboard the *World Discoverer,* a vessel designed to travel to the world's hidden corners but with the comfort of air-conditioned cabins, a theater, observation lounge, sauna and pool.

The cruise is an in-depth study of the Amazon Basin tropical jungle from Iquitos, Peru, to Belem, Brazil. A team of naturalists leads forest walks to view wildlife and boat expeditions on river tributaries to isolated Indian villages.

At the end of this adventure you can join the Antarctic Cruise at Rio de Janeiro or Montevideo. A special rate is available if you take both trips.

The Amazon Cruise offers special rates to FONZ members. Call FONZ at 673-4960 today for more information.

New FONZ Facilities

FONZ keeps on making your Zoo visits more and more enjoyable. Here are the new facilities open just this summer:

Panda Plaza, just past the Panda House on Olmsted Walk, includes:

Panda Apparel Shop—brand new, featuring quality T-shirts, polo shirts, beach wraps, hats, bags and other apparel.

Panda Gift Shop—renovated, now carrying an expanded line of gifts. (Remember, FONZ members enjoy a 10% discount on all gifts and apparel.)

Panda Hot Dogs—specially-designed trailer facility joins the Panda Ice Cream kiosk.

More great food:

Popcorn Wagon—at the camel yard.

Ice Cream Carts—roving the Zoo, offering "Chipburgers," ice cream sandwiches made with chocolate chip cookies.

Panda Cafe—now featuring fresh-made pizza.

Mobile Information Carts—FONZ Information Aides rove the Zoo with these carts. They can tell you about current events and new animals, give you maps and brochures, and show you animal artifacts like elephant teeth, orangutan hair and flamingo feathers.

More great trips. . .

Call 673-4960 to receive complete information on these exciting 1983 FONZ adventures:

China-Tibet
August 30-September 20 (Only a few spaces left so call now!)

Antarctic Cruise
November 24-December 17

For the following 1984 trips, details will be given in upcoming *Zoo-goers*—watch for them:

India-Nepal
January 21-February 10

South Pacific, Australia, New Zealand
*February-March**

Galapagos
*April**

Iceland-Greenland
*July**

China-Tibet
*September-October**

Kenya
*August**

*Exact dates to be announced.

Wildlife Students Receive Certificates

Congratulations to three graduates of the Wildlife Studies Certificate Program: Leo Boberschmidt of Kensington, Maryland; Maria Buschman of Arlington, Virginia; and Victor Muller of Alexandria, Virginia.

The National Zoo and Friends of the National Zoo established the Wildlife Studies Certificate in 1982 to be awarded to FONZ members and other interested individuals who complete a minimum of six courses in the Certificate Series. In the past year, more than 200 FONZ members have enrolled in these courses to learn about wildlife care and conservation from experts on the Zoo staff and from wildlife organizations.

The Wildlife Studies Certificate Program has been well received by FONZ members, and more certificates will be awarded at the end of the summer. If you would like more information about this program, please contact Anne Marie Tabacco at 673-4961 or Dr. Robert Hoage at 673-4840.

Call for Nominations

In accord with Article II of our bylaws, the FONZ Board of Directors is hereby soliciting nominations from the membership.

Board Reponsibilities

As members of a "working" Board, FONZ Directors "administer and manage" the affairs of the Friends of the National Zoo. The Board of Directors establishes the policies of the Corporation, approves budgets and expenditure of funds and otherwise directs and supervises the activities of FONZ officers and employees. Much of the Board's work is accomplished through active committees that develop programs, budgets and policies for the various FONZ activities and oversee their implementation. The principal committees include:

The *Administration Committee,* which establishes and supervises administrative policies and procedures for FONZ employees.

The *Education Committee,* which participates in the development of FONZ-supported educational programs and supervises all educational activities authorized by the Board.

The *Finance Committee,* which institutes, develops and supervises the fiscal operations of the Corporation.

The *Front Royal Committee,* which coordinates FONZ support programs at the Zoo's Conservation and Research Center at Front Royal, Virginia.

The *Membership Committee,* which is responsible for recruiting new members to FONZ and for developing membership activities.

The *Publications Committee,* which supervises the publication and distribution of *Zoogoer* and *PawPrints.*

The *Visitor Services Committee,* which oversees the management and operation of the FONZ gift shop, food, parking and other visitor service facilities at the Zoo.

All Board members serve on at least one of these committees, and many attend two or more FONZ meetings each month. Board members serve on a voluntary basis without pay.

Criteria for Selection of Directors

The criteria by which potential candidates are judged for nomination to the Board of Directors are: the candidate's strong interest in supporting zoological education, research and conservation in accordance with the purposes of our Corporation; leadership; experience or skills that are needed and would directly benefit the management and operations of FONZ; and willingness and time to participate fully in FONZ work and activities. As a strong working Board, Directors are expected to attend a total of 15 to 20 full Board meetings, committee meetings and special events a year, usually scheduled on weekdays from noon to 2 p.m. Candidates must be dues-paying members of FONZ.

Nomination Procedures

Nominations may be made only by dues-paying family, couple or individual memberships in good standing. (Senior citizen, contributing and patron memberships of FONZ and members who previously joined the Corporation as life members are entitled to all rights and privileges of dues-paying family, couple or individual members as appropriate.) Employees of FONZ or the National Zoo are not eligible for membership on the FONZ Board of Directors. All nominations must be submitted on an official FONZ nomination form with a biographical sketch of the nominee attached. Nomination forms can be obtained at the FONZ office or will be mailed upon request.

For information and/or the required forms, call 673-4950.

The deadline for submitting nomination forms and accompanying biographical sketches is August 1, 1983.

Address submissions to: Ms. Nella C. Manes, Chairperson, FONZ Nominating Committee, Friends of the National Zoo, National Zoological Park, Washington, D.C. 20008.

WHAT'S NEW AT THE ZOO?

Summer Hours
Grounds: 8 a.m.-8 p.m.
Animal houses: 10 a.m.-6 p.m.
Education Building: 9 a.m.-5 p.m.

Free Films
Education Building Auditorium
Daily, 10:30 a.m.-4:30 p.m., every hour on the half hour.

Zoo, a behind-the-scenes look at the animals and people of the National Zoo, and *The Last Chance*, which describes the Zoo's Conservation and Research Center, are shown alternately.

Daily, 12 noon and 1:30 p.m., *The Giant Panda*, a film from China, is shown.

Daily, between these films, short slide shows and brief films about wildlife are presented.

Meet a Snake
Monday through Friday, 10:30 a.m. and 3 p.m., outside the Reptile House.
Keepers take an animal out where you can see it up close and ask questions.

Elephant Training
Daily, 2 p.m.-3 p.m., Elephant House.
Keepers work with the animals during elephant management-training sessions.

Puppet Shows
Tuesday through Sunday, 10 a.m.-3:30 p.m., every half hour, July 5 through August 14.
Young Zoo Aides perform puppet shows outside (weather permitting). Check at the Information Booths for show locations.

Zoo Babies
Great Ape House—orangutan born February 22.

Monkey House—Colobus monkey born March 28; white-cheeked gibbon born June 8; spider monkey born February 15.

Hoofed Stock area—zebra born May 6; bongo born March 21; muntjac born March 10.

Bird House—two hoopoes born April 18.

Raccoon Trail—bobcat born April 28.

Small Mammal House—many babies, including degus, chinchilla and rock cavy.

New Animal
Reptile House—Euracoan rattlesnake.

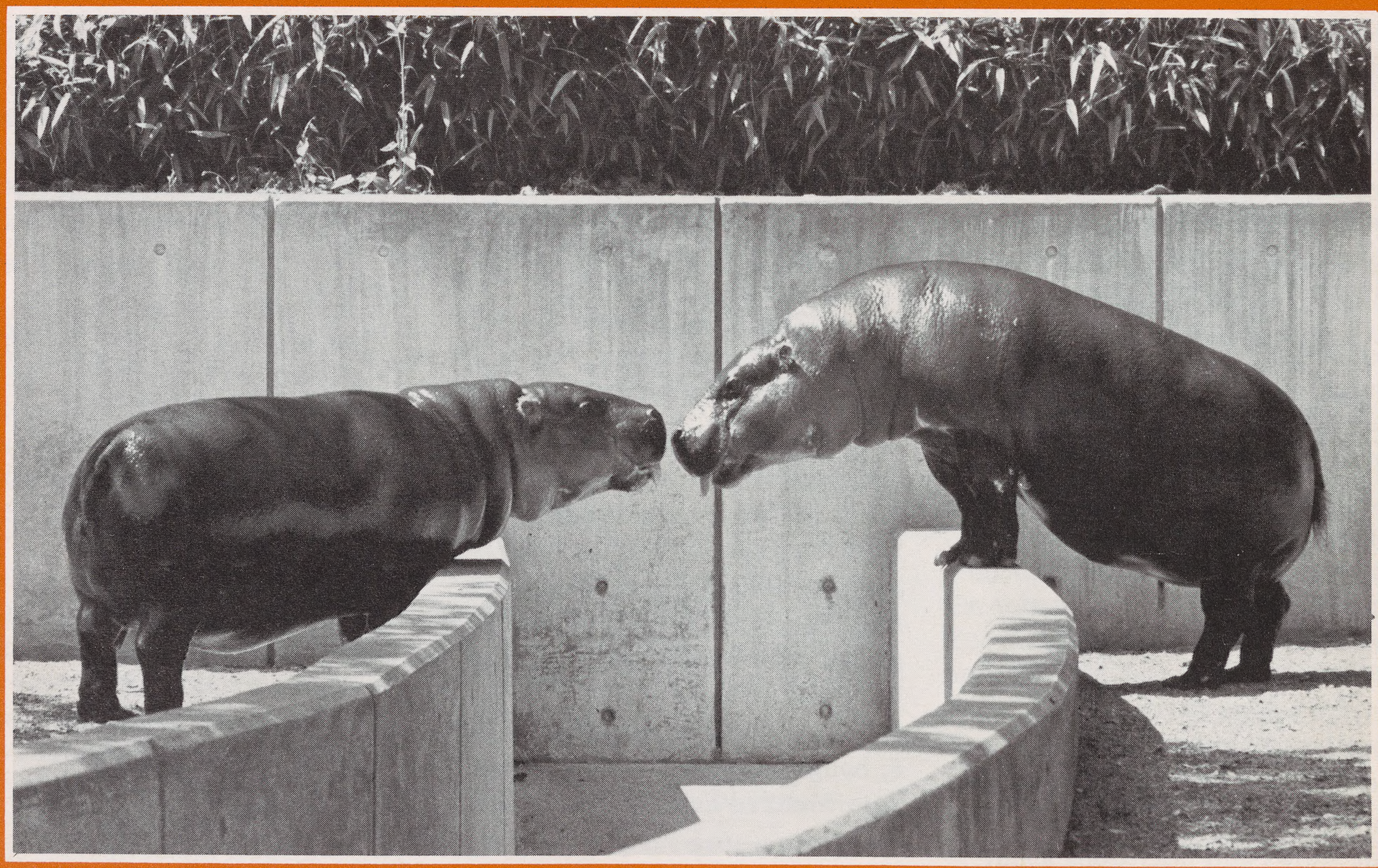
Learning Labs—natural objects to examine, activities to do and books to read.

ZOOlab
Tuesday through Sunday, 12 noon to 3 p.m., Education Building. Pick up free tickets in the lobby.

BIRDlab
Friday through Sunday, 12 noon to 3 p.m., Bird House. No tickets required; just walk in.

HERPlab
Wednesday through Sunday, 12 noon to 3 p.m., Reptile House. For people 6 years old and up. Free tickets at the lab door, right in the middle of the Reptile House.

Giant Panda House
If Ling-Ling, our giant panda, is pregnant, she will need privacy. So the Giant Panda House may be closed around mid-July. Should that happen, you can see the pandas on a TV monitor in the Education Building lobby.



Jessie Cohen, NZP Office of Graphics and Exhibits

Most of the pygmy hippos in American zoos come from the National Zoo. They are rare in the wild, but more than 50 have been born here.

Friends of the National Zoo
National Zoological Park
Washington, D.C. 20008

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